REMARKS

The Applicants appreciate the Examiner's thorough examination of the subject application and request reconsideration of the subject application based on the following remarks.

On page 8, the language has been amended to clarify the content of the specification. No new matter is added by this correction.

Claim 1 stands rejected under 35 U.S.C. 102 (b). Claims 1 and 4 stand rejected under 35 U.S.C. 102 (e). Claims 1, 3 and 4 stand rejected under 35 U.S.C. 112 first paragraph, and 35 U.S.C. 112 second paragraph. Claims 2 and 5-8 were withdrawn from consideration.

35 U.S.C. 112, FIRST PARAGRAPH REJECTIONS

Claims 1, 3 and 4 stand rejected under 35 U.S.C. 112 as non-enabled by the specification. This rejection is respectfully traversed. The Office Action questions whether the "Determination of graphite material" on page 9 of the specification is enabled, based on the absence of guidance in how to make or find carbon materials that will satisfy the claimed attributes. The Office action assumes that section B "Determination of graphite material" should present the guidance in how to make or find carbon materials. The specification is more than adequate to do just that. For example, the process for the selection of appropriate graphite material is recited in section A on pages 7-8 of the application as filed. The language in the first sentence of page 8 has been amended to clarify idiomatic English and clearly points out available

materials. In addition, a method is recited on page 8 to prepare graphite materials that satisfy the conditions of (a) and (b) from graphitic materials that do not satisfy the claimed attributes. See page 8, line 23 to page 9, line 1: "The graphite materials which are unable to satisfy the said conditions (a) and (b) specified in the present invention can also be used if they are subjected to recalcination treatment at 2,000-3,200°C so that they meet the conditions of (a) and (b)." The process for obtaining graphite materials with the claimed attributes is more than adequately described in the specification, but if the Examiner wishes any further clarifying language without changing the meaning of the original disclosure, the applicants will be pleased to make such clarifications.

Accordingly, claims 1, 3 and 4 satisfy the requirements of 35 U.S.C. 112, first paragraph and, therefore, these claims are allowable and it is respectfully requested that this rejection be withdrawn.

35 U.S.C. 112, SECOND PARAGRAPH REJECTIONS

Claims 1, 3 and 4 stand rejected under 35 U.S.C. 112 on the grounds that there is indefiniteness concerning the identified claims. The Office action states that "In the expression: $y \leqq 42x^{-0.6}$ the claim is indefinite because the value on the right side and the value on the left side of the inequality have different units, and therefore cannot be sensibly compared." The expression, $y \leqq 42x^{-0.6}$, as defined in claim 1, recites the area indexing the appropriate graphitic material for use as a negative electrode in a lithium ion secondary battery. The curve, $y=42x^{-0.6}$, defines the maximum allowable surface area (y) for a given particle size (x) and was generated by regression of experimental

data. Therefore, the inequality shows an index for selecting the graphitic material used as a negative electrode in a lithium ion battery. As the index is comparing a proportional relationship of two parameters x and y, it is not required that the unit of measure for left side corresponds to the unit of measure for the right side of the inequality.

The Office action further states that "the physical significance of length to a fractional power is indefinite." Formula (II) is an index for selecting graphitic materials with appropriate particle size and surface area characteristics. The term "$42x^{-0.6}$" is a mathematical construct that resulted from regression of the experimental data that is used to define the index for evaluating graphitic materials. This expression is not intended to refer to a measurement of length but to an experimentally determined mathematical relationship which provides the advantages of the claimed invention. One skilled in the art would know well how to calculate whether particular systems would correspond to the expression. Therefore, the term, $42x^{-0.6}$, is definite in meaning to one skilled in the art.

Accordingly, it is respectfully submitted that claims 1, 3 and 4 satisfy the requirements of 35 U.S.C. 112 and, as such, are in a condition for allowance.

35 U.S.C. 102 REJECTIONS

Claim 1 stands rejected under 35 USC §102(b) as being anticipated by Omaru et al. (US Patent 5,561,005)("'005"), with evidence shown in Omaru US Patent 5,639,575 ("'575") and Fauteux US Patent 5,512,392. Claims 1 and 4 stand rejected under 35 USC §102(e) as anticipated by Yamada et al. (US Patent 5,776,610). These rejections

are respectfully traversed.

The Office action recites that Omaru '005 discloses a secondary lithium battery having a graphitic anode formed from 'LONZA KS-75' graphite with a particle size of 28.4 microns (col. 15, lines 50-60) and the Examiner estimates the surface area as less than 7.65 m^2/g. The Office action further states that "it is unclear if there are significant distinctions between the inventive and prior art graphite materials." The average grain diameter of LONZA KS-75 described in Omaru '575 is the same as the value used in Omaru '005 (see col. 10, Table 2, Example 6 and col. 8, lines 54-57). In the declaration of Dr. H. Sato on April 6, 2000, Dr. Sato pointed out that LONZA KS-75 graphite had an average particle size of 23.7 microns and a surface area of 7.2 m^2/g. In addition, Dr. Sato, inquired to Mr. Miura of LONZA JAPAN (TIMCAL JAPAN CO., LTD) regarding the particle size of LONZA KS-75 graphite. Mr. Miura responded that the particle size (d_{50}) of LONZA KS-75 is 17.0-26.0 μm (see attached sheet). The average particle size is determined as the median of the d_{50} size range reported by Mr. Miura (21.5 microns).

An experimentally determined equation relating the BET determined surface area (y) and the average particle size (x) of LONZA KS series graphites was disclosed in the declaration by Dr. Sato submitted on April 6, 2000 such that $y = 52x^{-0.62}$. The surface area calculated using the experimentally determined equation for the LONZA KS graphite with a 28.4 micron particle size disclosed by Omaru '005 is 6.5 m^2/g which agrees with the examiner's assertion that the surface area is less than 7.65 m^2/g. A LONZA KS-75 graphite material with an average particle size of 28.4 microns and a

surface area of 6.5 m^2/g does **not** satisfy Formula (II).

The average particle size reported in Yamada of 18.0 is within the manufacturer reported d_{50} particle size range of 17.0-26.0 microns. However, Yamada did **not** report a surface area for this graphite material. Further, it is unreasonable to expect the surface area of a graphite material with an average particle size of 18.0 microns to be the same as the surface area of a graphite material with an average particle size of 23.7 microns. The declaration submitted on April 6, 2000 by Dr. Sato disclosed experimentally determined surface areas and particle sizes for LONZA KS series graphite materials wherein the surface area of a graphite material with a particle size of 23.7 microns was 7.2 m^2/g and the surface area of a graphite material with a particle size of 17.5 microns was 9.2 m^2/g. Accordingly, the surface area for the graphite material reported by Yamada must be greater than 7.2 m^2/g. Using the experimentally determined formula, $y=52x^{-0.62}$, disclosed in the declaration, the Yamada material has a surface area of 8.7 m^2/g. A LONZA KS-75 graphite material with an average particle size of 18.0 microns and a surface area of 8.7 m^2/g does **not** satisfy Formula (II), or recited in the present claims.

Table 1

Data Source For LONZA KS-75	Average Particle Size :**x** (μm)	Specific Surface Area: **y** (m^2/g)	Value of the right side of Formula (II): $42x^{-0.6}$	Fomula (II) $Y \leq 42x^{-0.6}$
Omaru '005	28.4	6.5*	5.6	**Not** satisfied
Dr. H. Sato	23.7	7.2	6.3	**Not** satisfied
LONZA JAPAN	21.5	7.8*	6.7	**Not** satisfied
Yamada	18.0	8.7*	7.4	**Not** satisfied

* Calculated surface area using the experimentally determined equation from the declaration.

The graphite material with an 18.0 μm average particle size disclosed by Yamada does **not** satisfy the conditions of the present claims. The material does not satisfy the Formula (II). Further, the carbon particles recited by Yamada have R=0.43 and R=0.62 (col. 6 line 36 and col. 7 line 54) and these values are clearly not within the range claimed in the current invention of R=0.001 and R=0.2 required by condition (b).

None of the experimental data for LONZA KS-75 satisfy formula (II). Consequently, **none** of the LONZA KS series of graphites satisfy formula (II) as disclosed and claimed herein. In Fauteux, Omaru '005, Omaru '575, and Yamada, a number of the LONZA KS series of graphites were used as graphitic anodes for a secondary lithium batteries. The cited references do **not** disclose or suggest the use of materials meeting the claimed recitations. Moreover nothing in the prior art discloses or suggests using graphite materials that satisfy conditions (a) or (b).

The arguments presented in the previous response clearly and substantially establish that lithium ion secondary batteries using graphite satisfying formula (II)

exhibit superior properties in the Doping capacity, the Undoping capacity, the capacity at 2.8 mA/cm^2 and the capacity at 5.6 mA/cm^2 as compared to those batteries which use graphite material that does not satisfy formula (II). **None** of LONZA KS series of graphites satisfied formula (II) as disclosed and claimed herein.

Likewise, the prior art did not disclose any systems that inherently met the limitations of formula (II). Therefore, none of the prior art references anticipated the invention of the present claims, and the § 102 rejections should be withdrawn.

Further, nothing in the prior art discloses or suggests that secondary lithium batteries having the graphitic anode satisfying the above formula (II) will provide excellent first cycle efficiency, doping capacity, undoping capacity, capacity at 2.8 mA/cm^2 and capacity at 5.6 mA/cm^2. Further, in all the cited references, since the commercial graphites (LONZA KS-6, KS-15, KS-25, KS-44 and KS-75) which do **not** satisfy the above formula (II) were used, there was no intention disclosed that the graphite satisfying the above formula (II) could or should be used for an anode in a secondary battery.

Therefore, it would not have been obvious from any combination of the references to one of the ordinary skill in this art to design a secondary lithium battery having the graphitic anode satisfying the characteristics of the present claims, or obtain the technical advantages of such a design.

Accordingly, the present invention would not have been obvious from the cited references at the time it was made.

The undersigned would appreciate an opportunity to discuss the above case with

the examiner, and to try to answer any questions the Examiner may have. If the undersigned can be of any assistance in expediting the prosecution of this case, the Examiner is requested to call the undersigned, at the number given below.

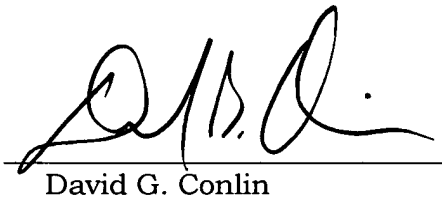
It is respectfully submitted that the subject application is in a condition for allowance. Early and favorable action is requested.

Applicants believe that additional fees are not required for consideration of the within Response. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge Deposit Account No. **04-1105**.

Respectfully submitted,

EDWARDS & ANGELL

Date: September 20, 2000

By: 

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